11TH DRMC NATIONAL SCIENCE CARNIVAL

LINE FOLLOWER ROBOT COMPETITION

THE RULEBOOK

General Rules:

- The participants of this competition must be registered under a team. A team must have a team name and a team leader. A team can have maximum **4 members**.
- The teams have to make an autonomous line follower robot that follow black lines on the white surface under various conditions.
- The contest will have two rounds - Primary Round and Final Round. A limited number of teams will be selected for the Final round based on total points of the Primary round.
- Number of teams selected for the Final round will be decided on the competition day based on the number of participating teams.
- Primary round consist of basic line following challenges which include curved lines, intersections, right angles (90 degree turn), acute angles.
- In Final round, the qualified robots will have to cross line gap, a bridge and avoid an obstacle along with the challenges of the Primary round.
- Number of checkpoints and the time limit will be declared on the competition day.
- The winning team is declared based on the points.
- Each team has **5 restarts** for each round.
- Only 1 member from the team is allowed in the arena during the main run.

The following will lead a team to be disqualified:

- Evidence of disrespect to other teams and competitors.
- Evidence of disrespect to competition judges.

Arena Specification:

- The arena is a white rectangular surface with the dimension of **480 cm x 240 cm**.
- The autonomous robot will have to follow the black lines (on the white surface) which is **2.5 cm** wide.
- There will be a Start zone and a Finish zone on the beginning and the end of the line respectively. Both the Start and the Finish zone will be marked with black square shaped boxes with the dimension of **30 cm x 30 cm**.
- The distance between two adjacent black lines will be at least **30 cm** from center to center.
- The acute angles are not less than **30 degree**.

- The curved lines have a radius of curvature of at least **15 cm**.
- There is a **10 cm** line gap.
- The obstacle is a white cube with the dimension of **10 cm x 10 cm x 10 cm** .
- The ascending angle of the bridge will be less than **30 degree** and the descending angle will also be less than **30 degree**. The width of the bridge will be 30 cm.
- The Line Inverse is a 60 cm long path with white line of black surface.

N.B. Detailed dimensions are shown in the figures at the end of this rulebook.

Autonomous Robot Specification:

The autonomous robot must satisfy the following design rules.

- Height: Maximum **15 cm**
- Length: Maximum **20 cm**
- Width: Maximum **20 cm**
- Weight: Maximum **4 kg**
- Power: Maximum **18 Volt** between any two terminals of the circuit. Each team has to bring its own power supply for robot. No additional equipment/parts will be supplied in the competition.
- Maximum Number of switch allowed is **two** including the power switch and the reset switch.
- No wired/wireless communication between the operator and the line follower is allowed. If found the team will be disqualified immediately.

Flexibility:

- If any robot exceeds the maximum dimension, the team will not be disqualified but in that case, the team will concede a penalty of **5 points per cm** .
- The robot chassis can be ready-made or hand-made. The teams with Hand-made chassis will get **10 points**. However, readymade line follower robot (i.e. PiBot of Pololu, Easy LFR of Techshopbd) is not allowed in the competition.
- The robot can have ready-made or hand-made sensor array. The teams with Hand-made sensor array will get **10 points**. Sensor Arrays on pcb will not be considered as hand-made.

N.B. If any robot causes any harm to the arena, the team will be disqualified.

Gameplay:

- The teams must submit their robots for the ratification before the competition. During one's turn, he can receive the robot from the organizers.
- Each team will get 1 minute of calibration time before the main run. In case any team takes more than 1 minute of calibration time, the extra time will be subtracted from the main run time.
- At the start of the main run, the timer is reset and with the instruction of the host the timer starts. The operating member of the team then starts the robot from the Start zone.
- During the run time, picking up the robot or even touching it will cost a restart for the team.
- During any turn, if the total chassis of the robot gets out of the line, it will cost a restart.
- In case of a restart, the operating member of the team can pick up the robot only after the declaration of a restart by the host. Then s/he will have to put the robot before the checkpoint marking.
- During the run time, if the operating member wants to take a restart at any instant, s/he can do so by informing the host.
- In the Final round, if the robot touches the obstacle, it will cost a penalty.
- If the robot stops at the Finish zone, the team will get bonus points.

Point Criteria:

Criteria	**Points**
Design Bonus	10 + 10
Leaving Start Zone	10
Crossing each checkpoint	50
Stopping at the Finish zone	50
Complete without Restart	20
Crossing the Bridge	50
Avoiding the Obstacle	80
Colour Inverse	50

Timer point = T_{total} - $T_{calculated}$

Here,

T_{total} = The total assigned time in seconds.

$T_{calculated}$ = The total time taken by a team to complete the track.

Penalty:

Criteria	Points
Design Penalty	5 points / cm
Restarts	30
Touching the Obstacle	50

N.B. Any decision by the judges are final. In case of any confusion, the team leader can contact the judges during the competition.

Liability:

Participating teams are always responsible for the safety of their robots and are liable for any accidents caused by their team members or their robots.
The “11th DRMC National Science Carnival” organizing team members will not be held responsible nor liable for any incidents or accidents caused by participating teams or their equipment.

Track & Specs:

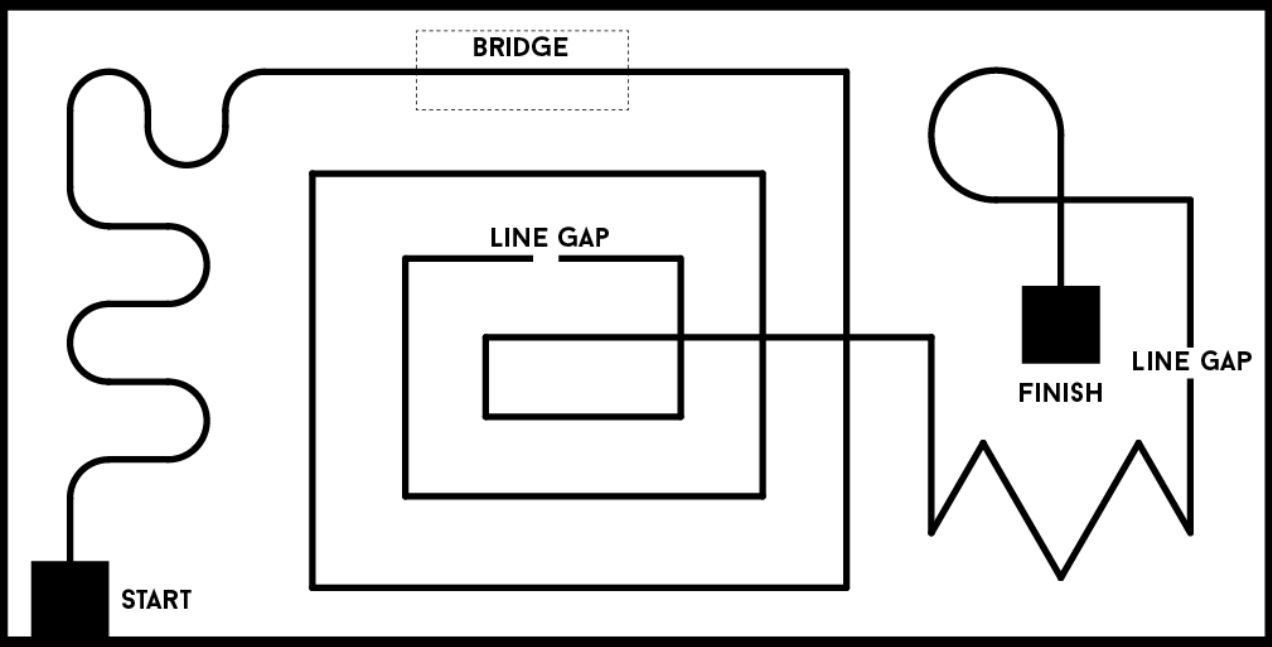

Figure 1: Primary Round

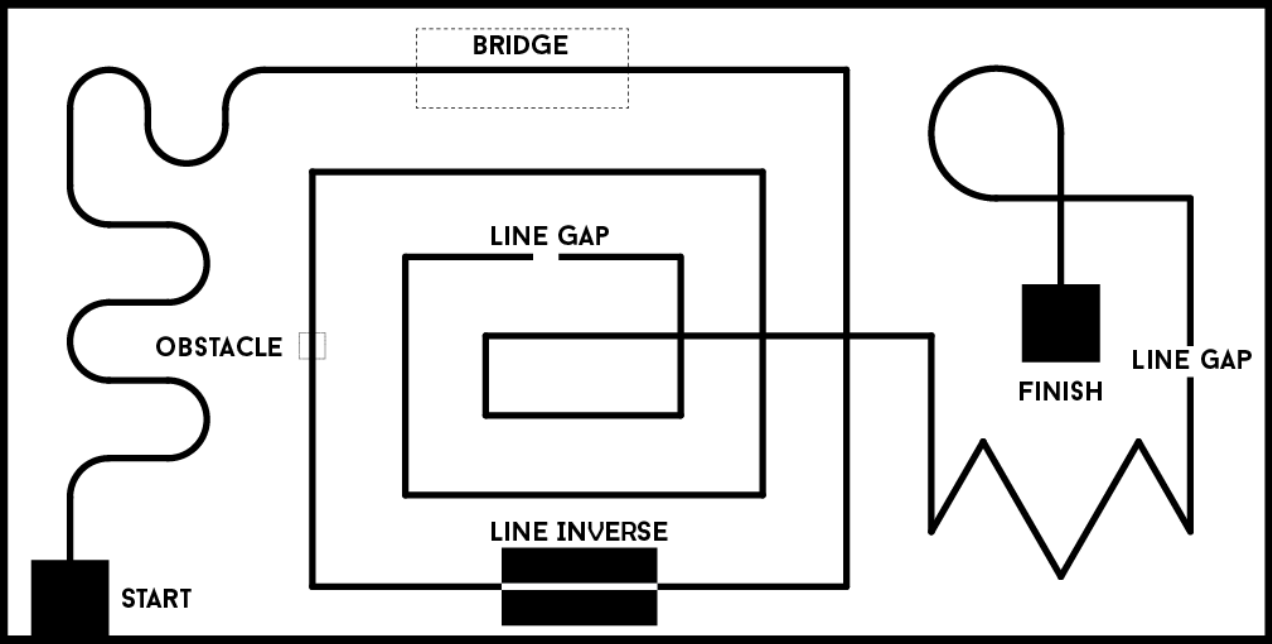

Figure 2: Final Round

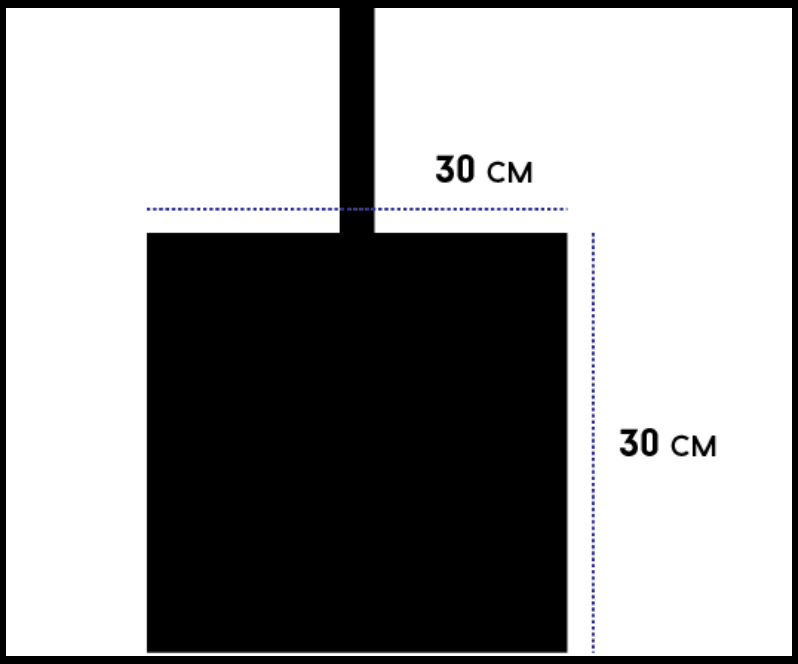

Figure 3: Start and Finish Zone

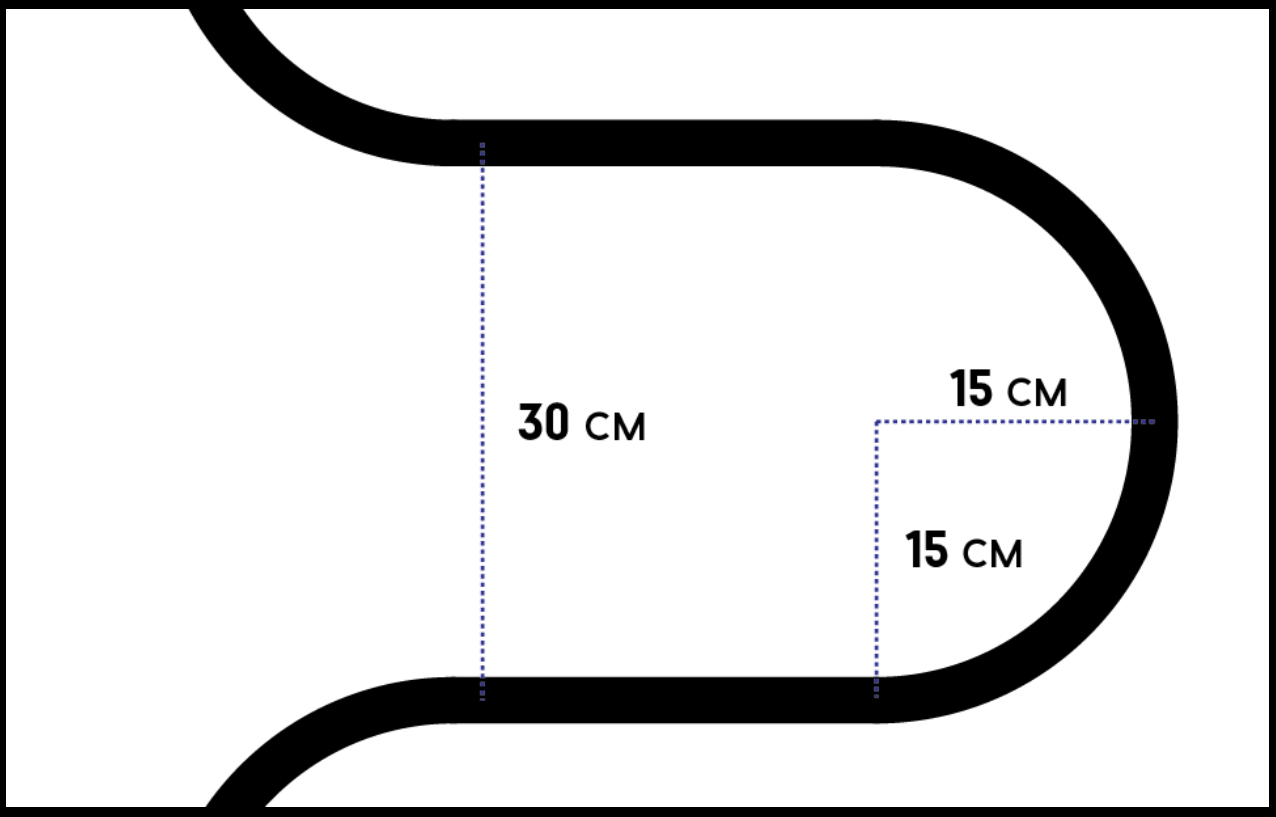

Figure 4: Curvature

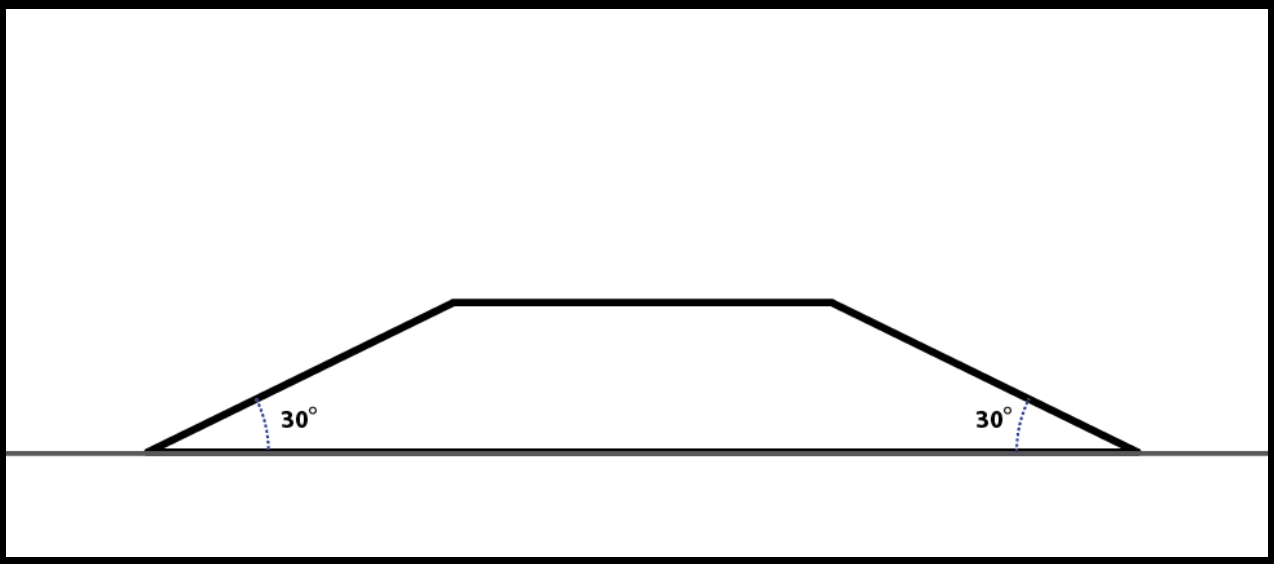

Figure 5: Bridge

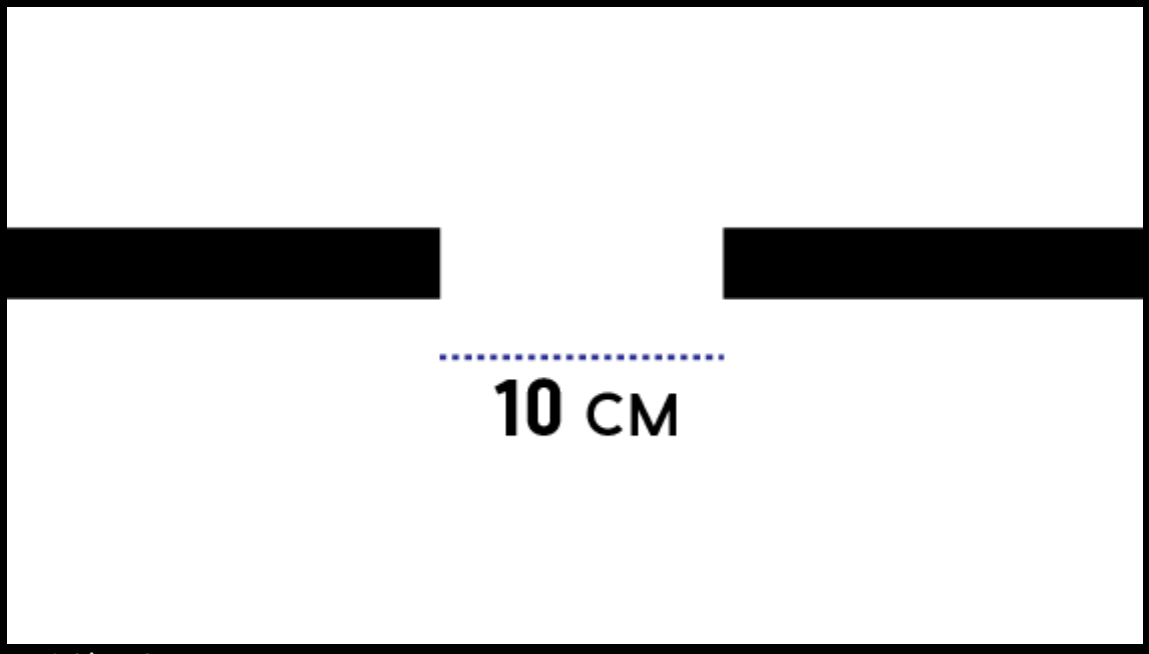

Figure 6: Line Gap

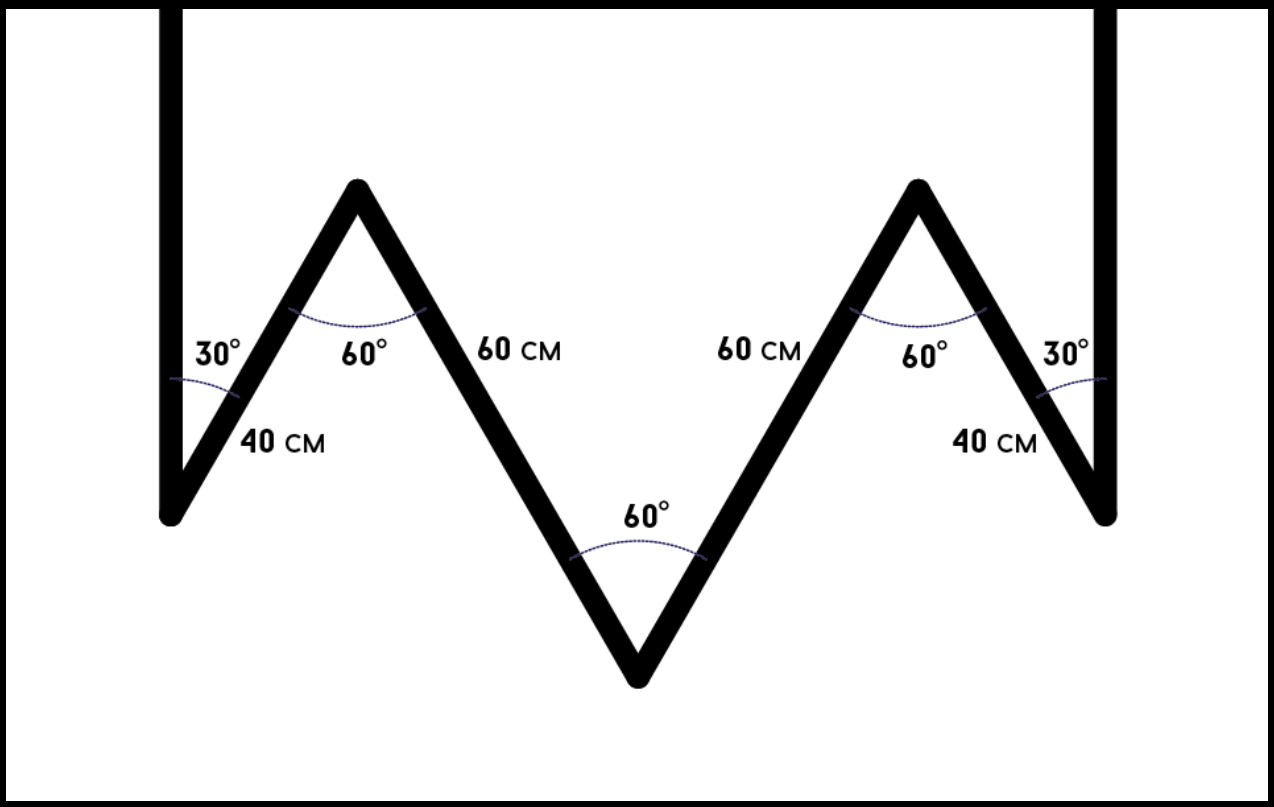

Figure 7: Zigzag

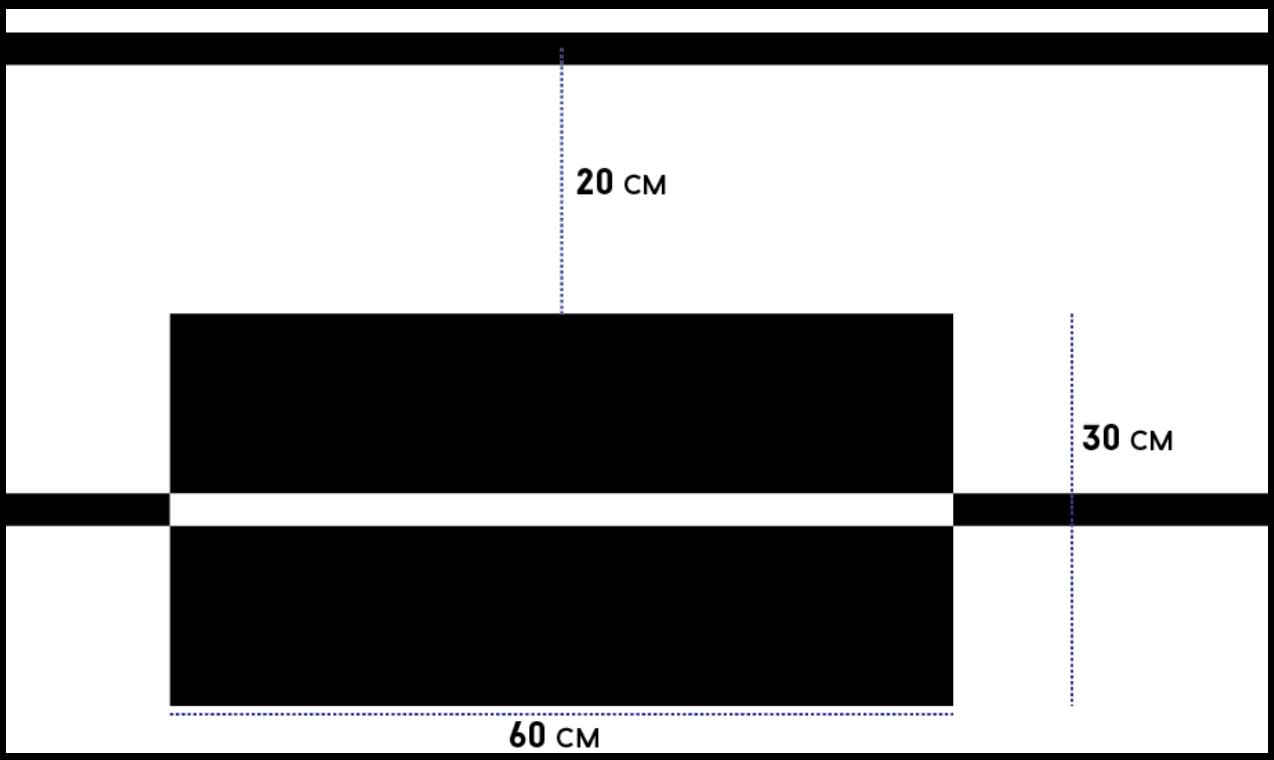

Figure 8: Colour Inverse

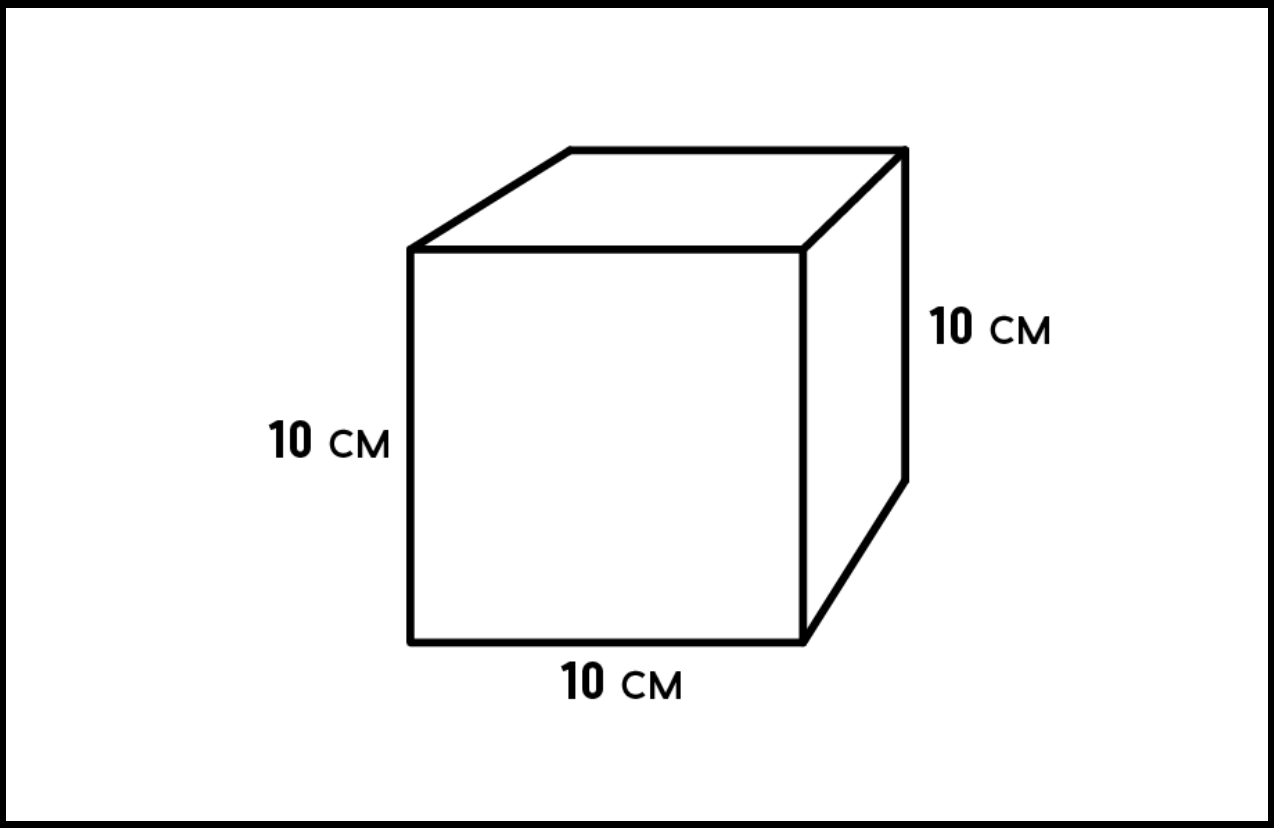

Figure 9: Obstacle

For any sort of query, please contact us at our Facebook event page:

https://www.facebook.com/events/876111849233407/